

# PATENT COOPERATION TREATY

UNITED STATES  
INTERNATIONAL SEARCHING AUTHORITY

Richard W. Keefe  
3600 Wilshire Boulevard  
Los Angeles, Calif. 90010

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

Issued pursuant to PCT Rule 44.1

Inscribe NAME and ADDRESS of the AGENT and if there  
is no agent, of the APPLICANT

DATE OF MAILING by the  
International Searching Authority **24 MAR 1982**

APPLICANT'S OR AGENT'S FILE REFERENCE  
Boeing-USSN 221,761

## IDENTIFICATION OF THE INTERNATIONAL APPLICATION

International Application No.

PCT/US 81/01714

International Filing Date

21 DECEMBER 1981

Applicant (Name)

THE BOEING COMPANY

## NOTIFICATION

The applicant is hereby notified that, in regard to the above-identified international application, this International Searching Authority transmits herewith:

1. ☒ the international search report.

THE ATTENTION OF THE APPLICANT IS DRAWN TO THE TIME LIMIT FOR AMENDING BEFORE THE INTERNATIONAL BUREAU ACCORDING TO ARTICLE 19(1) AND RULE 46.1 WHICH RUNS FROM THE DATE OF MAILING OF THE INTERNATIONAL SEARCH REPORT

2. ☐ the declaration to the effect that no international search report will be established.

THE ATTENTION OF THE APPLICANT IS DRAWN TO THE TIME LIMIT FOR COMPLYING WITH THE REQUIREMENTS OF ARTICLE 22(2).

☐ Applicant is further notified that, the protest against payment of an additional fee under Rule 40.2(c) together with the decision thereon has been transmitted to the International Bureau together with the request to forward the texts of both the protest and the decision thereon to designated Offices.

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THE UNITED STATES INTERNATIONAL SEARCHING AUTHORITY

Address only:

Commissioner of Patents and Trademarks  
Box PCT  
Washington, D. C. 20231

Attn: ISA/US

Authorized Officer

*Aaron Weisstuch*  
AARON WEISSTUCH

These Notes are intended to facilitate the use of the present form. For full information, see the text of the Patent Cooperation Treaty and the texts of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and the said texts, the latter are applicable. "Article" refers to Articles of the Treaty, "Rule" refers to Rules of the Regulations and "Section" refers to Sections of the Administrative Instructions.

1 "The international search report shall identify the International Searching Authority which established it by indicating the name of such Authority, and the international application by indicating the international application number, the name of the applicant, the name of the receiving Office, and the international filing date." (Rule 43.1)

2 "The international search report shall be dated and shall indicate the date on which the international search was actually completed. It shall also indicate the filing date of any earlier application whose priority is claimed." (Rule 43.2)

3 "The international search report shall contain the classification of the subject matter at least according to the International Patent Classification." (Rule 43.3 (a))

"Such classification shall be effected by the International Searching Authority." (Rule 43.3 (b))

"Where the subject matter of the international application is such that classification thereof requires more than one classification symbol according to the principles to be followed in the application of the International Patent Classification to any given patent document, the international search report shall indicate all such symbols." (Section 504 (a))

"Where any national classification system is used, the international search report may indicate all the applicable classification symbols also according to that system." (Section 504 (b))

"Where the subject matter of the international application is classified both according to the International Patent Classification and to any national classification system, the international search report shall, wherever possible, indicate the corresponding symbols of both classifications opposite each other." (Section 504 (c))

4 "The international search report shall list the classification identification of the fields searched. If that identification is effected on the basis of a classification other than the International Patent Classification, the International Searching Authority shall publish the classification used." (Rule 43.6 (a))

5 "If the international search extended to patents, inventors' certificates, utility certificates, utility models, patents or certificates of addition, inventors' certificates of addition, utility certificates of addition, or published applications for any of those kinds of protection, of States, periods, or languages, not included in the minimum documentation as defined in Rule 34, the international search report shall, when practicable, identify the kinds of documents, the States, the periods, and the languages to which it extended. For the purposes of this paragraph, Article 2 (ii) shall not apply." (Rule 43.6 (b))

6 "Subject to paragraphs (b) and (c), the international search report shall either state that the International Searching Authority approves the title and the abstract as submitted by the applicant or be accompanied by the text of the title and/or abstract as established by the International Searching Authority under Rules 37 and 38." (Rule 44.2 (a))

7 "If, at the time the international search is completed, the time limit allowed for the applicant to comment on any suggestion of the International Searching Authority in respect of the abstract has not expired, the international search report shall indicate that it is incomplete as far as the abstract is concerned." (Rule 44.2 (b))

8 The figure(s) suggested by the applicant is indicated in the check list of the request; see Rule 3.3 (a) (iii).

9 "If the applicant fails to make the indication referred to in Rule 3.3 (a) (iii), or if the International Searching Authority finds that a figure or figures other than that figure or those figures suggested by the applicant would among all the figures of all the drawings, better characterize the invention, it shall indicate the figure or figures which it so considers. Publications by the International Bureau shall then use the figure or figures so indicated by the International Searching Authority. Otherwise, the figure or figures suggested by the applicant shall be used in the said publications." (Rule 8.2)

10 This part of the report is filled in only where Article 17 (2) (b) applies. (Where certain claims were not searched because of lack of unity of invention and non-payment of additional fees, part V—rather than this part—is filled in.) Article 17 (2) reads as follows:

"(a) If the International Searching Authority considers

(i) that the international application relates to a subject matter which the International Searching Authority is not required, under the Regulations, to search, and in the particular case decides not to search, or

(ii) that the description, the claims, or the drawings, fail to comply with the prescribed requirements to such an extent that a meaningful search could not be carried out,

the said Authority shall so declare and shall notify the applicant and the International Bureau that no international search report will be established.

"(b) If any of the situations referred to in subparagraph (a) is found to exist in connection with certain claims only, the international search report shall so indicate in respect of such claims, whereas, for the other claims, the said report shall be established as provided in Article 18."

11 This part of the report is filled in only where, in the course of the procedure preceding the issuance of this report the International Searching Authority, having found that the international application does not comply with the requirement of unity of invention, invites the applicant to pay additional fees. See Article 17 (3) (a) reading as follows:

"If the International Searching Authority considers that the international application does not comply with the requirement of unity of invention as set forth in the Regulations, it shall invite the applicant to pay additional fees. The International Searching Authority shall establish the international search report on those parts of the international application which relate to the invention first mentioned in the claims ("main invention") and, provided the required additional fees have been paid within the prescribed time limit, on those parts of the international application which relate to inventions in respect of which the said fees were paid."

"If the applicant paid additional fees for the international search, the international search report shall so indicate. Furthermore, where the international search was made on the main invention only (Article 17 (3) (a)), the international search report shall indicate what parts of the international application were and what parts were not searched." (Rule 43.7)

12 See Article 17 (2) (a) (i), quoted in note 10, above, and Rule 39 reading as follows:

"No International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter is any of the following:

- (i) scientific and mathematical theories,
- (ii) plant or animal varieties or essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes,
- (iii) schemes, rules or methods of doing business, performing purely mental acts or playing games,
- (iv) methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods,
- (v) mere presentations of information,
- (vi) computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs."

13. See Article 17 (2) (a) (ii), quoted in note 10, above.

14 "The objective of the international search is to discover relevant prior art." (Article 15 (2))

Rule 33.1, entitled "Relevant Prior Art for the International Search," reads as follows:

"(a) For the purposes of Article 15 (2), relevant prior art shall consist of everything which has been made available to the public anywhere in the world by means of written disclosure (including drawings and other illustrations) and which is capable of being of assistance in determining that the claimed invention is or is not new and that it does or does not involve an inventive step (i.e., that it is or is not obvious), provided that the making available to the public occurred prior to the international filing date.

"(b) When any written disclosure refers to an oral disclosure, use, exhibition, or other means whereby the contents of the written disclosure were made available to the public, and such making available to the public occurred on a date prior to the international filing date, the international search report shall separately mention that fact and the date on which it occurred if the making available to the public of the written disclosure occurred on a date posterior to the international filing date.

"(c) Any published application or any patent whose publication date is later but whose filing date, or, where applicable, claimed priority date, is earlier than the international filing date of the international application searched, and which would constitute relevant prior art for the purposes of Article 15 (2) had it been published prior to the international filing date, shall be specially mentioned in the international search report."

15 "Where any document cited in the international search report is of particular relevance, the special indication required by Rule 43.5 (c) shall consist of the letter "X" placed next to the citation of the said document." (Section 505)

"Where any document cited in the international search report refers to an oral disclosure, use, exhibition, or other means referred to in Rule 33.1 (b), the separate indication required by that Rule shall

consist of the letter "O" placed next to the citation of the said document." (Section 507 (a))

"Where any document cited in the international search report is a published application or patent as defined in Rule 33.1 (c), the special mention required by that Rule shall consist of the letter "E" placed next to the citation of the said document." (Section 507 (b))

"Where any document cited in the international search report is a document which defines the general state of the art, it shall be indicated by the letter "A" placed next to the citation of the said document." (Section 507 (c))

"Where any document cited in the international search report is a document whose publication date occurred earlier than the international filing date of the international application, but later than the priority date claimed in that application, it shall be indicated by the letter "P" next to the citation of the said document." (Section 507 (d))

"Where any document cited in the international search report is a document whose publication date occurred after the filing date or the priority date of the international application and is not in conflict with the said application, but is cited for the principle or theory underlying the invention, which may be useful for a better understanding of the invention, or is cited to show that the reasoning or the facts underlying the invention are incorrect, it shall be indicated by the letter "T" next to the citation of the document." (Section 507 (e))

"Where in the international search report any document is cited for reasons other than those referred to in the preceding paragraphs, such document shall be indicated by the letter "L" next to the citation of the document." (Section 507 (f))

16 "The international search report shall contain the citations of the documents considered to be relevant." (Rule 43.5 (a))

"Identification of any document cited in the international search report referred to in Rule 43.5 (b) shall be made by indicating the following elements in the order in which they are listed:

(a) *In the case of any patent document* (patent documents being patents within the meaning of Article 2 (ii) as well as published applications relating thereto):

- (i) the Office that issued the document, by the two-letter code as in *Annex B*;
- (ii) the kind of document, by the appropriate symbols as in *Annex C*;
- (iii) the number of the document as given to it by the Office that issued it; (for Japanese patent documents the indication of the year of the reign of the Emperor must precede the serial number of the patent document);
- (iv) the date of publication of the cited patent document as indicated thereon;
- (v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings; and
- (vi) the name of the patentee or applicant.

(The following example illustrates the citation of a patent document according to paragraph (a) above:

JP, B, 5014535, published 28 May 1975, see column 4, lines 3 to 27, NCR Corporation.)

(b) *In the case of any book or other separately issued publication*

- (i) the name of the author;
- (ii) the title (including, where applicable, the number of the edition and/or volume);
- (iii) the year of publication (when this coincides with the year of the international application or of the priority claim, the International Searching Authority shall endeavour to determine the month and, if necessary, the day of publication and to indicate these data in the international search report);
- (iv) the name of the publisher;
- (v) as far as available, the place of publication (where only the location of the publisher appears on the book or other separately issued publication, then that location shall be indicated as the place of publication); and
- (vi) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of a book or other separately issued publication according to paragraph (b) above:

H. Walton, 'Microwave Quantum Theory', Volume 2, published 1973, by Sweet and Maxwell (London), see pages 138 to 192, especially pages 146 to 148.)

(c) *In the case of any article published in a periodical or other serial publication*:

- (i) the title of the periodical or other serial publication;
- (ii) the number of the volume and the date of the issue in which the article appears;
- (iii) as far as available, the place of publication (where only the location of the publisher appears in the periodical or other serial publication, then that location shall be indicated as the place of publication);
- (iv) the author and the title of the article and the number of the page both on which the article starts and ends; and
- (v) where applicable, the pages, columns or lines where the relevant passages appear, or the relevant figures of the drawings.

(The following example illustrates the citation of an article published in a periodical or other serial publication according to paragraph (c) above:

IBM Technical Disclosure Bulletin, Volume 17, no. 5, issued October 1974 (Armonk, New York), J. G. Drop, 'Integrated Circuit Personalization at the Module Level', see pages 1344 to 1345.)

(d) *In the case of abstracts*

- (i) the identification of the document containing the abstract in the manner set forth in paragraphs (a), (b) and (c), respectively, depending upon whether the abstract is contained in a patent document, in a book or other separately issued publication, or in an article published in a periodical or other serial publication;
- (ii) in the case where the abstract is not published together with the full text document which served as its basis, the identification of both abstract and full text document on the basis of whatever bibliographic data may be available in respect thereto."

(The following example illustrates the citation of an abstract according to paragraph (d) (ii) above:

Chemical Abstracts, Volume 75, no. 20, issued 15 November 1971 (Columbus, Ohio, U.S.A.), D. I. Shetulov, 'Surface Effects During Metal Fatigue' see page 163, column 1, the abstract no. 120718k, Fiz.-Khim. Mekh. Mater. 1971,7(2), 7-11 (Russ).") (Section 503)

17 "If only certain passages of the cited document are relevant or particularly relevant, they shall be identified, for example, by indicating the page, the column, or the lines, where the passage appears." (Rule 43.5 (e))

18 "Citations which are not relevant to all the claims shall be cited in relation to the claim or claims to which they are relevant." (Rule 43.5 (d))

"The claims to which cited documents are relevant shall be indicated by placing in the appropriate column of the international search report:

- (i) where the cited document is relevant to one claim, the number of that claim; for example, (2) or (17);
- (ii) where the cited document is relevant to two or more claims numbered in consecutive order, the numbers of the first and last claims of the series connected by a hyphen; for example, (1-15) or (2-3);
- (iii) where the cited document is relevant to two or more claims that are not numbered in consecutive order, the number of each claim placed in ascending order and separated by a comma or commas; for example, (1,6) or (1,7,10);
- (iv) where the cited document is relevant to more than one series of claims under (ii) above, or to claims of both categories (ii) and (iii) above, the series or individual claim numbers and series placed in ascending order using commas to separate the several series, or to separate the numbers of individual claims and each series of claims; for example, (1-6, 9-10, 12-15) or (1, 3-4, 6, 9-11)." (Section 508)

19 "Any correspondence from an International Authority to the applicant or his agent shall be marked with the file reference, composed either of letters or numbers, or both, of the applicant or the agent, if so indicated on the request form, provided this reference does not exceed ten characters." (Section 108 (b))

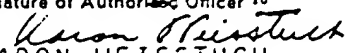
20 "The international search report shall be signed by an authorized officer of the International Searching Authority." (Rule 43.8)

# PATENT COOPERATION TREATY INTERNATIONAL SEARCH REPORT

<b>IDENTIFICATION OF INTERNATIONAL APPLICATION</b>		Applicant's or Agent's File Reference <sup>18</sup>
International Application No. <sup>1</sup>		Boeing-USSN 221.761
PCT/US 81/01714	International Filing Date <sup>1</sup>	
Receiving Office <sup>1</sup>		21 DECEMBER 1981
RO/US		Priority Date Claimed <sup>3</sup>
Applicant <sup>1</sup>		31 DECEMBER 1981
THE BOEING COMPANY		
I. <input type="checkbox"/> CERTAIN CLAIMS WERE FOUND UNSEARCHABLE <sup>10</sup> (Observations on supplemental sheet (2))		
II. <input checked="" type="checkbox"/> UNITY OF INVENTION IS LACKING <sup>11</sup> (Observations on supplemental sheet (2))		
III. TITLE, ABSTRACT AND FIGURE OF DRAWING		
1. The following indicated items are approved as submitted by the applicant: <sup>6</sup>		
<input checked="" type="checkbox"/> Title. <input type="checkbox"/> Abstract.		
2. The texts established by this International Searching Authority of the following indicated items are set forth below:		
<input type="checkbox"/> Title. <input type="checkbox"/> Abstract.		
<input type="checkbox"/> Text of the abstract continued on supplemental sheet (1)		
3. <input checked="" type="checkbox"/> This report is incomplete as far as the abstract is concerned as the time limit for comments by the applicant on the draft prepared by this International Searching Authority has not expired. <sup>7</sup>		
4. The figure of the drawings indicated below is to be published with the abstract:		
<input checked="" type="checkbox"/> Figure No. <u>2</u> as suggested by the applicant. <sup>8</sup> Figure No. _____ because:		
<input type="checkbox"/> applicant failed to suggest a figure. <sup>9</sup>		
<input type="checkbox"/> this figure better characterizes the invention. <sup>9</sup>		

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 81/01714

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>8</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC INT. CL. <sup>3</sup> H01L 31/06; H01L 31/18; C23C 13/08 US. CL. 136/260; 427/74; 118/690		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
US	136/252; 255; 258; 260; 264; 255 427/74; 76; 87; 255.2 <span style="float: right;">729</span> 148/174; 178; 357/16; 30J; 118/688-691; 719; 725;	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category <sup>6</sup>	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>
A	US, A, 3,978,510, Published 31 August 1976, Kasper et al	1-29
A,P	US, A, 4,251,287, Published 17 February 1981, Dalal	1-29
A	N, Inst.. Phys. Conf. Ser. No. 35, Issued 1977, L.L. Kazmerski, "The Utilization of I-III-VI <sub>2</sub> Ternary Compound Semiconductors In Thin-Film Heterojunction And Homo Junction Photovoltaic Devices," pp. 217-228.	1-29
X	N, 3rd European Community Photovoltaic Solar Energy Conference, Cannes, France, Oct. 1980, E.R. Don et al, "Copper Indium Diselenide For CdS:CuInSe <sub>2</sub> Solar Cells", pp. 897-901.	1-29
X	N, IEEE Transactions On Electron Devices, Vol. ED-21, Issued 1977, L. Kazmerski et al, "Auger Analysis of CdS-CuInSe <sub>2</sub> Thin-Film Solar Cells", pp. 496-498.	1-29
X	N, Applied Physics Letters, Vol. 29, Issued 1976, L. Kazmerski et al, "Thin-Film CuInSe <sub>2</sub> /CdS Heterojunction Solar Cells," *	1-29
* Special categories of cited documents: <sup>15</sup> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means.</p> </div> <div style="width: 45%;"> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search <sup>1</sup>	Date of Mailing of this International Search Report <sup>2</sup>	
05 MARCH 1982	24 MAR 1982	
International Searching Authority <sup>1</sup>	Signature of Authorized Officer <sup>10</sup>	
ISA/US	 AARON WEISSTUCH	

## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

	pp. 268-270.	
X	N, Japan J. Appl. Phys., Vol. 16, Issued 1977, Y. Kokuhun et al, "Photovoltaic Effect In CuInSe <sub>2</sub> -CdS Heterojunctions, pp. 879-880.	1-29
A	N, J. Vac. Sci. Technol., Vol. 16, Issued 1979, F.R. White et al, "Growth of CuInSe <sub>2</sub> Films Using Molecular Beam Epitaxy", pp. 287-289.	1-29
X	US, A, 3,316,386, Published 25 April 1967, Yaffe et al	30-34

\*

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE <sup>10</sup>

This International search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers ..... because they relate to subject matter <sup>12</sup> not required to be searched by this Authority, namely:

2. ☐ Claim numbers ..... because they relate to parts of the International application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out <sup>13</sup>, specifically:

VI. ☒ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING <sup>11</sup>

This International Searching Authority found multiple inventions in this International application as follows:

- I. Claims 1-29, drawn to method of making solar cell and solar cell produced thereby;
- II. Claims 30-34, drawn to vapor deposition apparatus

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the International application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the International application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

## Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

A	US, A, 3,531,335, Published 1970, Heyerdahl et al	29 September	30-34
X	US, A, 3,636,916, Published 1972, Thelen et al	25 January	30-34
A	US, A, 3,914,856, Published 1975, Fang	28 October	30-34
X	US, A, 4,036,167, Published Lu	19 July 1977,	30-34
X	US, A, 4,059,067, Published 1977, Lardon et al	22 November	30-34
A,E	US, A, 4,313,254, Published 1982, Feldman et al	02 February	30-34

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